

10/519812

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SEQUENCE LISTING

<110> Byrne, Barry J.
Mah, Cathryn S.

<120> rAAV COMPOSITIONS AND METHODS FOR DELIVERY OF HUMAN FACTOR VII
POLYPEPTIDES AND TREATMENT OF HEMOPHILIA A

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<140> UNKNOWN
<141> 2004-12-28

<150> PCT/US03/20756
<151> 2003-06-30

<150> 60/392,725
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<170> PatentIn version 3.2

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Glu Glu Ala His Gly Val Leu His Arg Arg Arg Arg Ala Asn Ala Phe
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Gln Cys Ser Phe Glu Glu Ala Arg Glu Ile Phe Lys Asp Ala Glu Arg
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Ser Pro Cys Gln Asn Gly Gly Ser Cys Lys Asp Gln Leu Gln Ser Tyr
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Gly Tyr Ser Leu Leu Ala Asp Gly Val Ser Cys Thr Pro Thr Val Glu
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Tyr Pro Cys Gly Lys Ile Pro Ile Leu Glu Lys Arg Asn Ala Ser Lys
195 200 205

Pro Gln Gly Arg Ile Val Gly Gly Lys Val Cys Pro Lys Gly Glu Cys
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Pro Trp Gln Val Leu Leu Val Asn Gly Ala Gln Leu Cys Gly Gly
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Thr Leu Ile Asn Thr Ile Trp Val Val Ser Ala Ala His Cys Phe Asp
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Lys Ile Lys Asn Trp Arg Asn Leu Ile Ala Val Leu Gly Glu His Asp
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Leu Ser Glu His Asp Gly Asp Glu Gln Ser Arg Arg Val Ala Gln Val
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Ile Ile Pro Ser Thr Tyr Val Pro Gly Thr Thr Asn His Asp Ile Ala
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Glu Glu Ala His Gly Val Leu His Arg Arg Arg Arg Ala Asn Ala Phe
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Leu Glu Glu Leu Arg Pro Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu
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Gln Cys Ser Phe Glu Glu Ala Arg Glu Ile Phe Lys Asp Ala Glu Arg
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Thr Lys Leu Phe Trp Ile Ser Tyr Ser Asp Gly Asp Gln Cys Ala Ser
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Ser Pro Cys Gln Asn Gly Gly Ser Cys Lys Asp Gln Leu Gln Ser Tyr
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Tyr Cys Ser Asp His Thr Gly Thr Lys Arg Ser Cys Arg Cys His Glu
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Gly Tyr Ser Leu Leu Ala Asp Gly Val Ser Cys Thr Pro Thr Val Glu
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Tyr Pro Cys Gly Lys Ile Pro Ile Leu Glu Lys Arg Asn Ala Ser Lys
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Pro Gln Gly Arg Ile Val Gly Gly Lys Val Cys Pro Lys Gly Glu Cys
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Pro Trp Gln Val Leu Leu Leu Val Asn Gly Ala Gln Leu Cys Gly Gly
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Thr Leu Ile Asn Thr Ile Trp Val Val Ser Ala Ala His Cys Phe Asp
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Lys Ile Lys Asn Trp Arg Asn Leu Ile Ala Val Leu Gly Glu His Asp
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Thr Ala Leu Glu Leu Met Val Leu Asn Val Pro Arg Leu Met Thr Gln
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Asp Cys Leu Gln Gln Ser Arg Lys Val Gly Asp Ser Pro Asn Ile Thr
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Glu Tyr Met Phe Cys Ala Gly Tyr Ser Asp Gly Ser Lys Asp Ser Cys
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Lys Gly Asp Ser Gly Gly Pro His Ala Thr His Tyr Arg Gly Thr Trp
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Tyr Leu Thr Gly Ile Val Ser Trp Gly Gln Gly Cys Ala Thr Val Gly
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His Phe Gly Val Tyr Thr Arg Val Ser Gln Tyr Ile Glu Trp Leu Gln
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Phe Pro
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Gly	Ser	Cys	Lys	Asp	Gln	Leu	Gln	Ser	Tyr	Ile	Cys	Phe	Cys	Leu	Pro
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Ala	Phe	Glu	Gly	Arg	Asn	Cys	Glu	Thr	His	Lys	Asp	Asp	Gln	Leu	Ile
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Gly Gly Lys Val Cys Pro Lys Gly Glu Cys Pro Trp Gln Val Leu Leu
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Leu Val Asn Gly Ala Gln Leu Cys Gly Gly Thr Leu Ile Asn Thr Ile
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Trp Val Val Ser Ala Ala His Cys Phe Asp Lys Ile Lys Asn Trp Arg
225 230 235 240

Asn Leu Ile Ala Val Leu Gly Glu His Asp Leu Ser Glu His Asp Gly
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Asp Glu Gln Ser Arg Arg Val Ala Gln Val Ile Ile Pro Ser Thr Tyr
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Val Pro Gly Thr Thr Asn His Asp Ile Ala Leu Leu Arg Leu His Gln
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Pro Val Val Leu Thr Asp His Val Val Pro Leu Cys Leu Pro Glu Arg
290 295 300

Thr Phe Ser Glu Arg Thr Leu Ala Phe Val Arg Phe Ser Leu Val Ser
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Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala Thr Ala Leu Glu Leu Met
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Val Leu Asn Val Pro Arg Leu Met Thr Gln Asp Cys Leu Gln Gln Ser
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Arg Lys Val Gly Asp Ser Pro Asn Ile Thr Glu Tyr Met Phe Cys Ala
355 360 365

Gly Tyr Ser Asp Gly Ser Lys Asp Ser Cys Lys Gly Asp Ser Gly Gly
370 375 380

Pro His Ala Thr His Tyr Arg Gly Thr Trp Tyr Leu Thr Gly Ile Val
385 390 395 400

Ser Trp Gly Gln Gly Cys Ala Thr Val Gly His Phe Gly Val Tyr Thr
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Phe Glu Glu Ala Arg Glu Ile Phe Lys Ser Pro Glu Arg Thr Lys Gln
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Glu His Ala Lys His Ser Ala Asn Thr Pro Arg Ile Thr Glu Asn Met
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Phe Cys Ala Gly Tyr Met Asp Gly Thr Lys Asp Ala Cys Lys Gly Asp
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Ser Gly Gly Pro His Ala Thr His Tyr His Gly Thr Trp Tyr Leu Thr
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Gly Val Val Ser Trp Gly Glu Gly Cys Ala Ala Ile Gly His Ile Gly
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1671

<210> 10
<211> 433
<212> PRT
<213> Danio rerio

<400> 10

Met Ser Leu Leu Leu Val Phe Ser Leu Leu Trp Ser Leu His Tyr Cys
1 5 10 15

His Ser Ala Ala Val Phe Val His Arg Asp Glu Ala His Glu Val Leu
20 25 30

Ile Arg Ser Lys Arg Ala Asn Ser Gly Trp Phe Glu Glu Leu Lys Thr
35 40 45

Gly Asn Leu Glu Arg Glu Cys Leu Glu Glu Lys Cys Ser Tyr Glu Glu
50 55 60

Ala Arg Glu Val Phe Glu His Thr Glu Ala Thr Asn Glu Phe Trp Lys
65 70 75 80

Ile Tyr Asp Val Lys Asp His Cys Ala Ser Ser Pro Cys Glu His Asp
85 90 95

Gly Leu Cys Thr Thr Gln Asn Ala Asp Ser Tyr Met Cys Leu Cys Ala
100 105 110

Pro Gly Phe Ser Gly Arg His Cys Glu Gln Ser Ile Gly Asp Val Leu
115 120 125

Asp Ser Cys Leu His Asp Asn Gly Gly Cys Glu His Phe Cys Thr Glu
130 135 140

Gln Asp Gly Arg Arg Asn Cys Ser Cys Ala Asp Gly Tyr Tyr Leu Asp
145 150 155 160

Asn Ser Gly Gln Lys Cys Arg Ser His Glu Val Phe Pro Cys Gly Lys
165 170 175

Val Pro Leu Leu Gln Ala Gly Lys Ala Ala Asp His Gln Val Asp Leu
180 185 190

Arg Ser Arg Ile Val Gly Gly Ser Glu Cys Pro Lys Gly His Cys Pro

195

200

205

Trp Gln Val Leu Leu Lys Tyr Gly Glu Lys Gly Phe Cys Gly Gly Val
210 215 220

Ile Tyr Lys Pro Thr Trp Ile Leu Thr Ala Ala His Cys Leu Glu Lys
225 230 235 240

Leu Lys Val Lys Phe Leu Arg Ile Val Ala Gly Glu His Asp Leu Glu
245 250 255

Val Asp Glu Gly Thr Glu Gln Leu Ile Gln Val Asp Gln Met Phe Thr
260 265 270

His Pro Ala Tyr Val Ser Glu Thr Ala Asp Ser Asp Ile Ala Leu Leu
275 280 285

Arg Leu Arg Thr Pro Ile Val Tyr Ser Val Tyr Ala Val Pro Val Cys
290 295 300

Leu Pro Leu Arg Glu Met Ala Glu Arg Glu Leu Trp Ala Val Ser Lys
305 310 315 320

His Thr Val Ser Gly Trp Gly Lys Arg Ser Glu Asp Gly Pro Thr Ser
325 330 335

Arg Leu Leu Arg Arg Leu Leu Val Pro Arg Ile Arg Thr Gln Glu Cys
340 345 350

Val Gln Val Ser Asn Leu Thr Leu Thr Ser Asn Met Phe Cys Ala Gly
355 360 365

Tyr Ile Glu Gly Arg Gln Asp Ser Cys Lys Gly Asp Ser Gly Gly Pro
370 375 380

Leu Val Thr Arg Tyr Arg Asp Thr Ala Phe Leu Leu Gly Ile Val Ser
385 390 395 400

Trp Gly Lys Gly Cys Ala Arg Pro Gly Ser Tyr Gly Ile Tyr Thr Arg
405 410 415

Val Ser Asn Tyr Leu Gln Trp Ile Arg Gln Thr Thr Asn Thr Thr Ile
420 425 430

His

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<210> 11
<211> 1341
<212> DNA
<213> Mus musculus

<400> 11
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ctagggactg cagtttcat aaccaggag gaagcacatg gtgtcctaca caggcaaagg      120
cgtgccaact cactcctgga ggagctttgg cccggctctc tggagagaga gtgcaatgag      180
gaacagtgct ccttgagga ggcccgggag atcttaaga gccctgagag gaccaagcag      240
ttctggattt tttacagtga tggggaccag tgtgcctcga atccatgtca gaacgttaggt      300
acctgccagg atcatctcaa gtcttacgtc tgcttctgcc tccttagactt tgagggtcgg      360
aactgtgaga aaagcaagaa tgagcagctg atctgtgcaa atgaaaatgg tgactgtgac      420
cagtaactgca gggaccatgt agggaccaag cgtacctgta gctgtcatga ggactacacg      480
ctacagccag atgaggtgtc ctgcaaacca aaagttgagt acccgtgtgg gagaataacct      540
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cccgccctgc tggacgccag atggatagt accgcagccc actgcttcga taatatccgc      720
tactggggaa acatcacagt ggtgatgggt gaacatgact tcagtgagaa ggatggggat      780
gagcaagtac gacgggtgac acaggtcatc atgcccgaca agtacatccg cggcaagatc      840
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agggtcagtg gctggggcca gctactggac cgtggtgcca cagccctgga actcatgtcc     1020
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accccaaaaa tcacagagaa catgttctgc gctggctaca tggatggtac caaggacgcc     1140
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ggtgtggtca gctgggggga gggctgtgca gctattggtc acattgggt gtacaccagg     1260
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<210> 12
<211> 446
<212> PRT
<213> Mus musculus

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<400> 12
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Met Val Pro Gln Ala His Gly Leu Leu Leu Cys Phe Leu Leu Gln
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Leu Gln Gly Pro Leu Gly Thr Ala Val Phe Ile Thr Gln Glu Glu Ala
20 25 30

His Gly Val Leu His Arg Gln Arg Arg Ala Asn Ser Leu Leu Glu Glu
35 40 45

Leu Trp Pro Gly Ser Leu Glu Arg Glu Cys Asn Glu Glu Gln Cys Ser
50 55 60

Phe Glu Glu Ala Arg Glu Ile Phe Lys Ser Pro Glu Arg Thr Lys Gln
65 70 75 80

Phe Trp Ile Val Tyr Ser Asp Gly Asp Gln Cys Ala Ser Asn Pro Cys
85 90 95

Gln Asn Val Gly Thr Cys Gln Asp His Leu Lys Ser Tyr Val Cys Phe
100 105 110

Cys Leu Leu Asp Phe Glu Gly Arg Asn Cys Glu Lys Ser Lys Asn Glu
115 120 125

Gln Leu Ile Cys Ala Asn Glu Asn Gly Asp Cys Asp Gln Tyr Cys Arg
130 135 140

Asp His Val Gly Thr Lys Arg Thr Cys Ser Cys His Glu Asp Tyr Thr
145 150 155 160

Leu Gln Pro Asp Glu Val Ser Cys Lys Pro Lys Val Glu Tyr Pro Cys
165 170 175

Gly Arg Ile Pro Val Val Glu Lys Arg Asn Ser Ser Ser Arg Gln Gly
180 185 190

Arg Ile Val Gly Gly Asn Val Cys Pro Lys Gly Glu Cys Pro Trp Gln
195 200 205

Ala Val Leu Lys Ile Asn Gly Leu Leu Leu Cys Gly Ala Val Leu Leu
210 215 220

Asp Ala Arg Trp Ile Val Thr Ala Ala His Cys Phe Asp Asn Ile Arg
225 230 235 240

Tyr Trp Gly Asn Ile Thr Val Val Met Gly Glu His Asp Phe Ser Glu
245 250 255

Lys Asp Gly Asp Glu Gln Val Arg Arg Val Thr Gln Val Ile Met Pro
260 265 270

Asp Lys Tyr Ile Arg Gly Lys Ile Asn His Asp Ile Ala Leu Leu Arg
275 280 285

Leu His Arg Pro Val Thr Phe Thr Asp Tyr Val Val Pro Leu Cys Leu
290 295 300

Pro Glu Lys Ser Phe Ser Glu Asn Thr Leu Ala Arg Ile Arg Phe Ser
305 310 315 320

Arg Val Ser Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala Thr Ala Leu
325 330 335

Glu Leu Met Ser Ile Glu Val Pro Arg Leu Met Thr Gln Asp Cys Leu
340 345 350

Glu His Ala Lys His Ser Ser Asn Thr Pro Lys Ile Thr Glu Asn Met
355 360 365

Phe Cys Ala Gly Tyr Met Asp Gly Thr Lys Asp Ala Cys Lys Gly Asp
370 375 380

Ser Gly Gly Pro His Ala Thr His Tyr His Gly Thr Trp Tyr Leu Thr
385 390 395 400

Gly Val Val Ser Trp Gly Glu Gly Cys Ala Ala Ile Gly His Ile Gly
405 410 415

Val Tyr Thr Arg Val Ser Gln Tyr Ile Asp Trp Leu Val Arg His Met
420 425 430

Asp Ser Lys Leu Gln Val Gly Val Phe Arg Leu Pro Leu Leu
435 440 445

<210> 13

<211> 1260

<212> DNA

<213> Gallus gallus

<400> 13

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gccaatagct	tcttgaaaa	gataaagctg	ggccactag	agcgagaatg	catagaagaa	180
aagtgttcat	ttgaggaagc	aagagagatc	taccgtatg	atgagaggac	aaaagagttc	240
tggcacatct	attctgaccc	caaccagtgt	gactccagcc	cctgtcagaa	cggagggagc	300
tgcgtgacc	agtttcagga	ttatgtctgc	cgctgtcctc	cggagttacga	gggcaaaagc	360
tgtgaaacag	ctgtggccga	gaacctgaag	tgcatttacg	acaacggcgg	ctgtgagcag	420
tactgtgctg	acgagcagtc	tgaaaaacga	gtgtgcttct	gtgcagaggg	ctacgcttta	480
gcgagtgtat	gagtgtcctg	cattccccaa	gtgaaatacc	cttgtggAAC	gataccagtg	540
ctggcaagaa	agaataacaac	tgctcagggg	agaatagtag	gtgggtgtcac	ctgtcctccg	600
ggtaatgtc	catggcaagc	ccttataata	caggatcaga	aaggaaatg	tgggggtagt	660
ctgctctcac	cagagtgggt	ggtgactgca	gctcattgcc	tggactacgc	tcattccaaa	720
cagctccggg	tgaggctggg	tgaatactca	gtaaaagttg	ctgagaaaac	tgagcaagaa	780
agtggagtt	gcaagatcat	caggcacgaa	gaatacacca	ttggacaagt	caatcatgac	840
attgccctcc	tgaagctgga	aacacccgtg	aatctcaccg	atttcgttgc	gccaatatgt	900
ttgcctgaaa	aacggttgc	agtgtacgag	ctgtcctcca	ttaagttctc	aatggtgagc	960
ggatggggac	ggctactaga	tggaggggct	acttctactt	ttctgtatgcg	agttcatttg	1020
ccccgtgtaa	agacacaaga	atgtgaaaag	caggctaatt	tgaacatcac	cgagaatatg	1080
ttctgtgcag	gagacctgac	cgtaaaaaaaaa	gactcctgca	agggagacag	tggtgacac	1140
cacgctacaa	agtacaagaa	cacctggttt	ctgactggga	ttgtcagctg	gggaaagggt	1200
tgtgctgttg	aaggcagcta	cgggtgtac	acaagggtat	ccagatacat	caactggttg	1260

<210> 14
<211> 425
<212> PRT
<213> Gallus gallus

<400> 14

Met	Val	Ser	Arg	Gln	Cys	Val	Ala	Leu	Leu	Leu	Cys	Phe	Pro	Leu	Leu
1						5				10				15	

Val	Pro	Pro	Ser	Lie	Glu	Ala	Val	Phe	Leu	Lys	Gln	Glu	Glu	Ala	Asn
							20		25				30		

Ser	Ile	Phe	Gln	Arg	His	Arg	Arg	Ala	Asn	Ser	Phe	Phe	Glu	Glu	Ile
								35		40			45		

Lys Leu Gly Pro Leu Glu Arg Glu Cys Ile Glu Glu Lys Cys Ser Phe

50

55

60

Glu Glu Ala Arg Glu Ile Tyr Arg Asp Asp Glu Arg Thr Lys Glu Phe
65 70 75 80

Trp His Ile Tyr Ser Asp Pro Asn Gln Cys Asp Ser Ser Pro Cys Gln
85 90 95

Asn Gly Gly Ser Cys Asp Asp Gln Phe Gln Asp Tyr Val Cys Arg Cys
100 105 110

Pro Pro Glu Tyr Glu Gly Lys Ser Cys Glu Thr Ala Val Ala Glu Asn
115 120 125

Leu Lys Cys Ile Tyr Asp Asn Gly Gly Cys Glu Gln Tyr Cys Ala Asp
130 135 140

Glu Gln Ser Glu Lys Arg Val Cys Phe Cys Ala Glu Gly Tyr Ala Leu
145 150 155 160

Ala Ser Asp Gly Val Ser Cys Ile Pro Gln Val Lys Tyr Pro Cys Gly
165 170 175

Thr Ile Pro Val Leu Ala Arg Lys Asn Thr Thr Ala Gln Gly Arg Ile
180 185 190

Val Gly Gly Val Thr Cys Pro Pro Gly Glu Cys Pro Trp Gln Ala Leu
195 200 205

Ile Ile Gln Asp Gln Lys Gly Lys Cys Gly Gly Ser Leu Leu Ser Pro
210 215 220

Glu Trp Val Val Thr Ala Ala His Cys Leu Asp Tyr Ala His Ser Lys
225 230 235 240

Gln Leu Arg Val Arg Leu Gly Glu Tyr Ser Val Lys Val Ala Glu Lys
245 250 255

Thr Glu Gln Glu Ser Gly Val Ser Lys Ile Ile Arg His Glu Glu Tyr
260 265 270

Thr Ile Gly Gln Val Asn His Asp Ile Ala Leu Leu Lys Leu Glu Thr
275 280 285

Pro Val Asn Leu Thr Asp Phe Val Val Pro Ile Cys Leu Pro Glu Lys
290 295 300

Arg Phe Ala Val Tyr Glu Leu Ser Ser Ile Lys Phe Ser Met Val Ser
305 310 315 320

Gly Trp Gly Arg Leu Leu Asp Gly Gly Ala Thr Ser Thr Phe Leu Met
325 330 335

Arg Val His Leu Pro Arg Val Lys Thr Gln Glu Cys Glu Lys Gln Ala
340 345 350

Asn Leu Asn Ile Thr Glu Asn Met Phe Cys Ala Gly Asp Leu Thr Gly
355 360 365

Lys Lys Asp Ser Cys Lys Gly Asp Ser Gly Gly Pro His Ala Thr Lys
370 375 380

Tyr Lys Asn Thr Trp Phe Leu Thr Gly Ile Val Ser Trp Gly Lys Gly
385 390 395 400

Cys Ala Val Glu Gly Ser Tyr Gly Val Tyr Thr Arg Val Ser Arg Tyr
405 410 415

Ile Asn Trp Leu Lys Arg His Met Glu
420 425

<210> 15
<211> 443
<212> PRT
<213> Oryctolagus cuniculus

<400> 15

Met Ala Pro Gln Ala Arg Gly Leu Gly Leu Cys Ser Leu Leu Ala Leu
1 5 10 15

Gln Ala Ser Leu Ala Ala Val Phe Ile Thr Gln Glu Glu Ala His Ser
20 25 30

Val Leu Arg Arg Gln Arg Arg Ala Asn Ser Phe Leu Glu Glu Leu Arg
35 40 45

Pro Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu Leu Cys Ser Phe Glu
50 55 60

Glu Ala Arg Glu Val Phe Gln Ser Thr Glu Arg Thr Lys Gln Phe Trp
65 70 75 80

Ile Thr Tyr Asn Asp Gly Asp Gln Cys Ala Ser Asn Pro Cys Gln Asn
85 90 95

Gly Gly Ser Cys Glu Asp Gln Ile Gln Ser Tyr Ile Cys Phe Cys Leu
100 105 110

Ala Asp Phe Glu Gly Arg Asn Cys Glu Lys Asn Lys Asn Asp Gln Leu
115 120 125

Ile Cys Met Tyr Glu Asn Gly Gly Cys Glu Gln Tyr Cys Ser Asp His
130 135 140

Val Gly Ser Gln Arg Ser Cys Arg Cys His Glu Gly Tyr Thr Leu Leu
145 150 155 160

Pro Asn Gly Val Ser Cys Thr Pro Thr Val Asp Tyr Pro Cys Gly Lys
165 170 175

Val Pro Ala Leu Glu Lys Arg Gly Ala Ser Asn Pro Gln Gly Arg Ile
180 185 190

Val Gly Gly Lys Val Cys Pro Lys Gly Glu Cys Pro Trp Gln Ala Ala
195 200 205

Leu Met Asn Gly Ser Thr Leu Leu Cys Gly Gly Ser Leu Leu Asp Thr
210 215 220

His Trp Val Val Ser Ala Ala His Cys Phe Asp Lys Leu Ser Ser Leu
225 230 235 240

Arg Asn Leu Thr Ile Val Leu Gly Glu His Asp Leu Ser Glu His Glu
245 250 255

Gly Asp Glu Gln Val Arg His Val Ala Gln Leu Ile Met Pro Asp Lys
260 265 270

Tyr Val Pro Gly Lys Thr Asp His Asp Ile Ala Leu Leu Arg Leu Leu
275 280 285

Gln Pro Ala Ala Leu Thr Asn Asn Val Val Pro Leu Cys Leu Pro Glu
290 295 300

Arg Asn Phe Ser Glu Ser Thr Leu Ala Thr Ile Arg Phe Ser Arg Val
305 310 315 320

Ser Gly Trp Gly Gln Leu Leu Tyr Arg Gly Ala Leu Ala Arg Glu Leu

325

330

335

Met Ala Ile Asp Val Pro Arg Leu Met Thr Gln Asp Cys Val Glu Gln
340 345 350

Ser Glu His Asn Pro Gly Ser Pro Glu Val Thr Gly Asn Met Phe Cys
355 360 365

Ala Gly Tyr Leu Asp Gly Ser Lys Asp Ala Cys Lys Gly Asp Ser Gly
370 375 380

Gly Pro His Ala Thr Ser Tyr His Gly Thr Tyr Leu Thr Gly Val Val
385 390 395 400

Ser Trp Gly Glu Gly Cys Ala Arg Val Gly His Val Gly Val Tyr Thr
405 410 415

Arg Val Ser Arg Asp Thr Glu Trp Leu Ser Arg Leu Met Arg Ser Lys
420 425 430

Leu His His Gly Ile Gln Arg His Pro Phe Pro
435 440

<210> 16
<211> 681
<212> PRT
<213> Mus musculus

<400> 16

Met Val Pro Gln Ala His Gly Leu Leu Leu Leu Cys Phe Leu Leu Gln
1 5 10 15

Leu Gln Gly Pro Leu Gly Thr Ala Val Phe Ile Thr Gln Glu Glu Ala
20 25 30

His Gly Val Leu His Arg Gln Arg Arg Ala Asn Ser Leu Leu Glu Glu
35 40 45

Leu Trp Pro Gly Ser Leu Glu Arg Glu Cys Asn Glu Glu Gln Cys Ser
50 55 60

Phe Glu Glu Ala Arg Glu Ile Phe Lys Ser Pro Glu Arg Thr Lys Gln
65 70 75 80

Phe Trp Ile Val Tyr Ser Asp Gly Asp Gln Cys Ala Ser Asn Pro Cys
85 90 95

Gln Asn Val Gly Thr Cys Gln Asp His Leu Lys Ser Tyr Val Cys Phe
100 105 110

Cys Leu Leu Asp Phe Glu Gly Arg Asn Cys Glu Lys Ser Lys Asn Glu
115 120 125

Gln Leu Ile Cys Ala Asn Glu Asn Gly Asp Cys Asp Gln Tyr Cys Arg
130 135 140

Asp His Val Gly Thr Lys Arg Thr Cys Ser Cys His Glu Asp Tyr Thr
145 150 155 160

Leu Gln Pro Asp Glu Val Ser Cys Lys Pro Lys Val Glu Tyr Pro Cys
165 170 175

Gly Arg Ile Pro Val Val Glu Lys Arg Asn Ser Ser Ser Arg Gln Gly
180 185 190

Arg Ile Val Gly Gly Asn Val Cys Pro Lys Gly Glu Cys Pro Trp Gln
195 200 205

Ala Val Leu Lys Ile Asn Gly Leu Leu Leu Cys Gly Ala Val Leu Leu
210 215 220

Asp Ala Arg Trp Ile Val Thr Ala Ala His Cys Phe Asp Asn Ile Arg
225 230 235 240

Tyr Trp Gly Asn Ile Thr Val Val Met Gly Glu His Asp Phe Ser Glu
245 250 255

Lys Asp Gly Asp Glu Gln Val Arg Arg Val Thr Gln Val Ile Met Pro
260 265 270

Asp Lys Tyr Ile Arg Gly Lys Ile Asn His Asp Ile Ala Leu Leu Arg
275 280 285

Leu His Arg Pro Val Thr Phe Thr Asp Tyr Val Val Pro Leu Cys Leu
290 295 300

Pro Glu Lys Ser Phe Ser Glu Asn Thr Leu Ala Arg Ile Arg Phe Ser
305 310 315 320

Arg Val Ser Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala Thr Ala Leu
325 330 335

Glu Leu Met Ser Ile Glu Val Pro Arg Leu Met Thr Gln Asp Cys Leu
340 345 350

Glu His Ala Lys His Ser Ser Asn Thr Pro Lys Ile Thr Glu Asn Met
355 360 365

Phe Cys Ala Gly Tyr Met Asp Gly Thr Lys Asp Ala Cys Ala Gly Asp
370 375 380

Ser Gly Gly Pro His Ala Thr His Tyr His Gly Thr Trp Tyr Leu Thr
385 390 395 400

Gly Val Val Ser Trp Gly Glu Gly Cys Ala Ala Ile Gly His Ile Gly
405 410 415

Val Tyr Thr Arg Val Ser Gln Tyr Ile Asp Trp Leu Val Arg His Met
420 425 430

Asp Ser Lys Leu Gln Val Gly Val Phe Arg Leu Pro Leu Leu Gly Ser
435 440 445

Ala Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro
450 455 460

Ala Pro Glu Leu Leu Gly Pro Ser Val Phe Leu Phe Pro Pro Lys
465 470 475 480

Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
485 490 495

Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
500 505 510

Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
515 520 525

Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
530 535 540

Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys
545 550 555 560

Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
565 570 575

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu
580 585 590

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
595 600 605

Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
610 615 620

Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu
625 630 635 640

Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val
645 650 655

Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln
660 665 670

Lys Ser Leu Ser Leu Ser Pro Gly Lys
675 680

<210> 17
<211> 407
<212> PRT
<213> Bos taurus

<400> 17

Ala Asn Gly Phe Leu Glu Glu Leu Leu Pro Gly Ser Leu Glu Arg Glu
1 5 10 15

Cys Arg Glu Glu Leu Cys Ser Phe Glu Glu Ala His Glu Ile Phe Arg
20 25 30

Asn Glu Glu Arg Thr Arg Gln Phe Trp Val Ser Tyr Asn Asp Gly Asp
35 40 45

Gln Cys Ala Ser Ser Pro Cys Gln Asn Gly Gly Ser Cys Glu Asp Gln
50 55 60

Leu Arg Ser Tyr Ile Cys Phe Cys Pro Asp Gly Phe Glu Gly Arg Asn
65 70 75 80

Cys Glu Thr Asp Lys Gln Ser Gln Leu Ile Cys Ala Asn Asp Asn Gly
85 90 95

Gly Cys Glu Gln Tyr Cys Gly Ala Asp Pro Gly Ala Gly Arg Phe Cys
100 105 110

Trp Cys His Glu Gly Tyr Ala Leu Gln Ala Asp Gly Val Ser Cys Ala
115 120 125

Pro Thr Val Glu Tyr Pro Cys Gly Lys Ile Pro Val Leu Glu Lys Arg
130 135 140

Asn Gly Ser Lys Pro Gln Gly Arg Ile Val Gly Gly His Val Cys Pro
145 150 155 160

Lys Gly Glu Cys Pro Trp Gln Ala Met Leu Lys Leu Asn Gly Ala Leu
165 170 175

Leu Cys Gly Gly Thr Leu Val Gly Pro Ala Trp Val Val Ser Ala Ala
180 185 190

His Cys Phe Glu Arg Leu Arg Ser Arg Gly Asn Leu Thr Ala Val Leu
195 200 205

Gly Glu His Asp Leu Ser Arg Val Glu Gly Pro Glu Gln Glu Arg Arg
210 215 220

Val Ala Gln Ile Ile Val Pro Lys Gln Tyr Val Pro Gly Gln Thr Asp
225 230 235 240

His Asp Val Ala Leu Leu Gln Leu Ala Gln Pro Val Ala Leu Gly Asp
245 250 255

His Val Ala Pro Leu Cys Leu Pro Asp Pro Asp Phe Ala Asp Gln Thr
260 265 270

Leu Ala Phe Val Arg Phe Ser Ala Val Ser Gly Trp Gly Gln Leu Leu
275 280 285

Glu Arg Gly Val Thr Ala Arg Lys Leu Met Val Val Leu Val Pro Arg
290 295 300

Leu Leu Thr Gln Asp Cys Leu Gln Gln Ser Arg Gln Arg Pro Gly Gly
305 310 315 320

Pro Val Val Thr Asp Asn Met Phe Cys Ala Gly Tyr Ser Asp Gly Ser
325 330 335

Lys Asp Ala Cys Lys Gly Asp Ser Gly Gly Pro His Ala Thr Arg Phe
340 345 350

Arg Gly Thr Trp Phe Leu Thr Gly Val Val Ser Trp Gly Glu Gly Cys
355 360 365

Ala Ala Ala Gly His Phe Gly Ile Tyr Thr Arg Val Ser Arg Tyr Thr
370 375 380

Ala Trp Leu Arg Gln Leu Met Gly His Pro Pro Ser Arg Gln Gly Phe
385 390 395 400

Phe Gln Val Pro Leu Leu Pro
405